4th International Conference on
ATOMIC AND NUCLEAR PHYSICS
October 26-27, 2018 | Boston, USA

Magnetic dipole, electric quadrupole moments and electron scattering form factors of neutron-rich cross - shell *sdpf* nuclei

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Magnetic dipole and electric quadrupole moments are calculated for neutron rich cross-shell *sdpf* nuclei. These nuclei include open shell isotopes with number of protons less than 20 and neutrons greater than 20, for which experimental data are available. Shell model calculations are performed with full *sd* shell-model space for Z-8 valence protons and full *pf* shell-model space for N-20 valence neutrons, where the remaining 20 neutrons are frozen in *s, p* and *sd*-shells. Also magnetic and Coulomb electron scattering form factors are calculated for some of these nuclei. Excitation out of major shell space are taken into account through a microscopic theory which allows particle-hole excitation from the core and model space orbits to all higher orbits with 2 $\hbar\omega$ excitation. Effective charges are obtained for each isotope. Core polarization (CP) is essential for obtaining a reasonable description of the electric quadrupole moments and enhance the Coulomb form factors, but has no effect on the dipole magnetic moments but squeezes the magnetic form factors. The magnetic static and dynamic properties can be described by free g factors for the model space nucleons without introducing core polarization effect, on the contrary to the electric static and dynamic properties, which cannot be described properly by the model space nucleons without taking into account core-polarization effects.

Biography

R A Radhi is a retired Professor of Physics, department of Physics, College of Science, University of Baghdad and Baghdad Iraq. He did his PhD from Michigan State University 1983, MSc from University of Baghdad 1974, BSc from University of Basrah 1972 field of interests: nuclear structure, electron scattering, electromagnetic transitions and moments, exotic and halo nuclei, computational physics, hydrodynamics. supervision: 18 MSc and 24 PhD students.

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